June 1981 Volume 2, Number 3

United States Department of Agriculture

Soil Conservation Service

Soil&Water Conservation News

Soil Surveys: An All-Purpose Land Use Planning Tool

by Ted Kupelian and Nancy Garlitz

Finding out about the soil and how it can best be used and managed before planting crops or building houses is a wise thing to do. There are lots of horror stories about the environmental damage, property damage, and financial loss caused by people using the soil for purposes it is unsuited for.

- Against advice offered on soil information, a landowner built a $30,000 house on a flood plain and put a $10,000 organ in the basement. The septic tank and filter field did not work and the basement flooded four times causing an estimated $40,000 worth of damage—a total loss of investment.
- A builder developed a 120-acre trailer court with sites for 185 mobile homes. The soils were not suited for septic tanks and the filter fields did not work. The loss to the developer was $50,000. But who can estimate the inconvenience to those who lived there?
- In an incident recounted by Thomas Pugh, Soil Conservation Service district conservationist, in an article in the September-October 1980 issue of the *Journal of Soil and Water Conservation*, soon after a couple had built their new house on a slab, 16 inches of water rose into the heat plenums and warm air picked up so much moisture that it condensed on the ceilings and dripped down onto their furniture. The couple was unaware of the soil information available which could have averted the problem.

Soil Conservation Service soil scientists map soils for the soil survey of the District of Columbia.

- In the same article, Pugh described the problems at an apartment complex that was built around a central hot water heating system powered by natural gas boilers. Fuel bills were twice the projected cost, and by the eighth year, the system was losing 20,000 gallons of water a day. A soil conservationist explained to the project consultant that the entire area was in Crosby silt loam, which has a seasonal high water table at 1 to 3 feet below the surface, generally from January through April, and an alkaline subsoil which is highly corrosive to uncoated steel. The water loss was caused by leaks in the uncoated steel pipes which had been insulated with styrofoam and placed 42 inches underground. The soil conservationist explained that had bituminous coated piping been used, it would have resisted the corrosive condition and provided insulation.

These are all dramatic examples of the kinds of problems land users can encounter if they don't check the soils first. Less dramatic than urban problems but more devastating to our resource base is the quiet slipping away of the Nation's richest topsoil because of the improper management of pasture and cropland.

To help all land users find out about the soil and how it can best be used and managed, the U.S. Department of Agriculture, in cooperation with State agricultural experiment stations and other Federal and State agencies, has been making soil surveys, usually on a county wide basis, and publishing them since 1899.

Published soil surveys contain, in addition to soil maps, general information about the agriculture and climate of the area and descriptions of each kind of soil. They include a discussion of the formation and classification of the soils in the area and also soil laboratory data when available.

Soil surveys published since 1957 contain many different kinds of interpretations for each of the different soils mapped in the area. The kinds of interpretations included in these recent surveys vary with the needs of the area, but the following interpretations are in most of them: Estimated yields of the common agricultural crops under defined

Continued on next page.

Soil and Water Conservation News is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in the transaction of public business required by law of this Department. Use of funds for printing *Soil and Water Conservation News* has been approved by the Director of the Office of Management and Budget through January 31, 1985. *Soil and Water Conservation News* (ISSN-0199-9060) is published 12 times a year. Controlled circulation postage paid at Washington, D.C.

Subscriptions
$10 per year, $12.50 foreign. Single copy domestic, $1.25; foreign, $1.60. Discounts of 25 percent on orders of 100 or more sent to the same address. Order directly from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

levels of management; land-capability interpretations; soil-woodland interpretations; rangeland interpretations; engineering uses of soils; interpretations for community planning; suitability of the soil for drainage and irrigation; and suitability of the soil for wildlife and for recreation.

The first part of a soil survey provides the descriptions of the soils and their limitations, potentials, and suitability for selected uses. The last part is a compilation of aerial maps with the various soils carefully delineated and identified by symbols.

In mapping the soils, soil scientists usually walk the land, acre by acre, boring holes up to 5 feet deep to determine the kind of soil. The soils are categorized and named according to their physical characteristics and chemical properties. Once identified, soils are delineated on the map. Each soil survey requires 3 to 8 years' work from mapping to publication.

For years, SCS soil conservationists have used soil surveys in helping farmers and ranchers plan conservation systems and determine which crops, grasses, trees, and wildlife would do best on their soils. Conservationists have also used soil surveys in helping city planners and builders avoid the unnecessary complications that accompany failure of foundations, soil slippage, flooded basements, and other structural breakdowns caused by adverse soil properties. Soil surveys describe in detail texture, acidity or alkalinity, amount of organic matter, depth to bedrock, water table, and many other factors. With this information land users can anticipate problems and take them into account in designing structures or selecting other sites for development.

Soil surveys also play a major part in farm management. Crop production depends largely on fitting soil management practices to the soil properties as accurately as possible. It is the right combination of a number of practices that gets optimum results.

SCS expects that the total U.S. land area will be mapped by about the year 1997. When you consider that there are about 2 billion acres in the United States and that 12,000 different kinds of soils have been classified, the dimensions of the task seem insurmountable. Nevertheless, about two-thirds of the country already has been mapped, and modern surveys for more than 1,400 county areas have been published. In fiscal year 1980, a record 133 soil surveys were published and more than 61 million acres were mapped.

As the population expands, all uses of land and soil become more competitive. Good agricultural land is under increasing pressure from urban growth and expanding facilities, such as housing, highways, and airports. These demands reflect the increasing importance of land as living space.

The United States is losing more than 2 million acres of land each year (about 9 square miles per day) to nonagricultural use. Much of this will be taken from our supply of irreplaceable, highly productive soils because the steep, rough areas are much less desirable for urban and public facility development. Most of the decisions will be irreversible, so the importance of sound land use planning is evident.

The best evidence that decisionmakers throughout the country increasingly recognize the value of soil surveys as statewide and nationwide planning tools is their financial support. Contributions to soil survey activities from other Federal, State, and local sources more than tripled from 5.8 million dollars in 1973 to 19.5 million dollars in 1979. Today almost one-third of the total funding of the soil survey program comes from sources other than the SCS appropriation.

As required by the Soil and Water Resources Conservation Act (RCA) of 1977, SCS has begun incorporating soil survey information into the Integrated Resource Information System (IRIS). Soil information is also being stored on a computer at Iowa State University and can be accessed through computer terminals which are available at most SCS State offices.

Information about soils is as close as the nearest library, soil conservation district office, county agent, or SCS field office. In addition to soil surveys, other publications are available to explain the importance of soils, including a series of SCS pamphlets designed specifically to tell farmers, ranchers, home buyers, construction engineers, land use planners, and others how soil survey information can help them.

"Soil surveys are the foundation of all our conservation efforts with land users to preserve our natural resource base," says SCS Chief, Norman A. Berg.

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Soil Conservation Service
U.S. Department of Agriculture
Washington, D.C. 20013

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Comments:
From the SCS Chief

Soil surveys can help land users protect our fragile soil, water, and related resources. Each published soil survey contains maps and detailed descriptions of soils in a wide area, typically a county. It also includes the limitations of each soil for farming, ranching, forestry, urban development, recreation, wildlife, and many other uses. Unfortunately, many people who should be using soil surveys do not know where to find the surveys or how to use them.

The Soil Conservation Service has leadership for the Nation's soil survey program, in cooperation with other Federal, State, and local agencies. Just as we are partners with these agencies in producing soil surveys, we must also be partners in promoting them, in insuring that land users and planners have access to them, and in teaching people how to use them.

Overall, soil surveys are available for two-thirds of the Nation, including many rapidly developing areas.

Recent studies reveal that each year the Nation loses 6.4 billion tons of soil to erosion and more than 2 million acres of rural land to development. Such figures underscore the urgency to complete mapping of the Nation's soils and to make sure that soil surveys get into the hands of land users and planners nationwide.

The surveys can help the users and planners to identify soils that are highly susceptible to erosion and to recognize highly productive soils that are threatened with conversion to nonagricultural uses. Such soils can then be protected against the erosive forces of wind and water and can be retained for agricultural uses.

In a time when statistics are pointing out the shocking vulnerability of our soils and related resources, the soil survey is perhaps the most useful tool available to battle erosion and to stop the thoughtless conversion of our soils to nonproductive uses. I urge each of you to help promote or "sell" soil surveys in your community or area. The United States is the world's number one agricultural producer; soil surveys can help us maintain that productivity.

Oregon Soil Survey Party Recruits Help

In Linn County, Oreg., the Soil Conservation Service soil survey party is working hard to overcome the current shortage of staff and funds. Russ Langridge, soil survey party leader, negotiated a cooperative agreement with Oregon State University to employ a senior soils student at no cost to SCS. For the 180 hours per term spent on map measurement and matching, the student receives 3 hours of college credit and an all-important letter of work experience.

Langridge recruited more free help through the Oregon Human Development Program, with a local senior high school student working 16 or more hours per week on map measurement. Another job is getting done with a stay-in-school position. Again, this employee is working on map measurement.

In addition, Langridge obtained help from members of the local historical society, in writing the historical section of the Linn County soil survey. Linn County is providing a soil scientist for a year to work with the SCS crew.

Altogether, Langridge has obtained nearly 2,700 hours of "free" assistance valued at $20,000.

Soil Surveys Help with Sinking, Shrinking Soils

by Danny Clement and Evon Stevens

It is plain for people living in or around New Orleans, La., to see that the soils have different textures and colors. But, it is the unseen characteristics of the soils—their potentials and limitations—that are causing front yards to sink away from houses, sewer lines to crack, and other problems to occur.

Twenty of the approximately 12,000 soils classified in the United States by the Soil Conservation Service are in the greater New Orleans area. Several of the 10 soils are organic and were formed in swamps and marshes that have been leveed and drained and now support urban development. The main problems with building on these organic soils are shrinking and sinking.

In the 1940's and 50's, development grew in Jefferson Parish, La., because of the population overflow from New Orleans, pushing development beyond the area considered suitable for urban use. It wasn't long before problems began with broken sewer systems, cracked streets, poor drainage, periodic flooding, tilted houses, cracked walls and foundations, and broken sidewalks. These problems reached a climax in 1977 when gas from broken lines left unsupported by sinking soil caused several houses to explode.

Back porch suspended—one of the many problems caused by sinking soil in the New Orleans area.

Driveway broken up—another of the problems caused by soil subsidence. Information in soil surveys can be used to avoid these problems.

The gas explosions prompted the Jefferson Parish Council to take action. "The single most serious problem facing Jefferson Parish people now and in the future is the problem of soil subsidence," said Councilman Aaron Broussard. The council requested assistance from the Crescent Soil and Water Conservation District (SWCD) and SCS.

The first thing SCS did was to make an interim soil survey of 1,000 acres of Jefferson Parish soils. The survey provided a base for recommending standards for future development on the organic soils and for determining where problems with sinking and shrinking could be expected to occur in areas of existing development.

Instead of the soils being mapped onto aerial photographs, which is the usual way of making soil surveys, the Jefferson Parish soils were mapped onto a street map to provide easy reference points for the urban community. The soils were rated from A to E for suitability for building, with A being the best suited. More than 11,000 copies of the interim soil survey were distributed to local residents.

To study the soil subsidence problem and make recommendations on a parish-wide basis, the parish council formed two committees, the Soil Subsidence Commit-

tee and the District 3 Gas Committee. SCS provided technical assistance to the committees in developing minimum standards to be followed in the construction of streets, sewer lines, and utility lines.

As a result of SCS and the Crescent SWCD and others working with the parish council, a Piling Ordinance was passed based on the soil survey information. In areas of specified soils, according to the ordinance, builders must drive piles of prescribed lengths and diameters into the ground to provide support for houses and other structures. Installing the piles, adding fill dirt, allowing it to settle, and adding more before construction begins will reduce the problems associated with building on the organic soils. To prevent gas explosions, the committees recommended that flexible connectors be installed between feeder lines and meters on houses to allow for movement of the soil.

It is true that based on the soils information for Jefferson Parish no one could recommend that the area made up of organic soils and semifluid mineral soils be used for urban development. But it is too late. So, armed with the interim soil survey and the soon-to-be-published detailed soil surveys of the East and West Banks of the parish, SCS is helping to make the best of a bad situation for Jefferson residents.

Danny Clement,
was SCS district conservationist in New Orleans, La., and is now area conservationist in Denham Springs.

Evon Stevens,
information technician, Crescent Soil and Water Conservation District, New Orleans, La.

Soil Information Used to Preserve Historic Missions

by Ervin L. Willard

Today, at the San Antonio Missions National Historical Park in Texas, the caretakers of Spanish missions built in the 1700's are coping with the same problems as many modern homeowners—leaking, crumbling foundations and walls. The problems are related to the soil, and the Soil Conservation Service is helping the National Park Service of the U.S. Department of the Interior to maintain and preserve the structures by providing soil information and making onsite investigations.

At the mission sites, water moves down easily through the permeable fine sandy loam surface soil but is trapped by the clayey subsoil. The trapped water lies against the limestone walls, and slowly seeps through.

When the clayey subsoil shrinks on drying and expands on wetting, it puts tremendous pressure on the mission structures, and when the moisture evaporates from the walls, it leaves salt deposits behind. These actions contribute to the physical and chemical deterioration of the missions.

One of the four missions included in the park, Mission Concepción, is the oldest unrestored stone Catholic church in the United States. The other missions are: Espada, San Juan, and San José. The National Park Service is encountering problems with water seepage at all four missions.

The park became part of the National Park System in 1978. As the General Management Plan for the park is developed and implemented, SCS will be consulted on the best sites for any planned development and on vegetation best suited to the soils and climate.

Modern soil information and soil testing techniques are helping to preserve an important part of our country's past for future generations.

Ervin L. Willard,
district conservationist, SCS, San Antonio, Tex.

Espada Mission in San Antonio, Tex., is one of four missions suffering from crumbling foundations and walls.

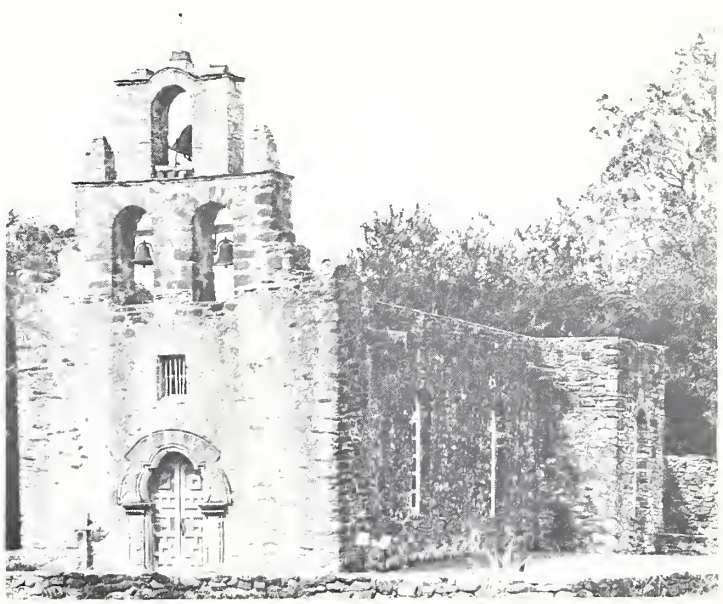

Photo courtesy National Park Service.

Onsite Sewage Treatment in Vermont

by Steve Foland and Nadine Pitts

A 150-year-old frame house nestled among granite outcroppings and tall maples in the rugged mountains of Vermont evokes a feeling of warmth and security. Yet real danger often lurks around some of these homesteads that have 19th-century plumbing systems capable of spreading pollution and disease to entire watersheds and towns.

A repair crew working on a State highway bridge near an old Vermont farmstead detected the foul odor of sewage in the small stream beneath them. They were shocked to discover a pipe upstream discharging untreated sewage effluent.

With a single telephone call to the health officer of the nearest town, a crew member set in motion a series of actions that resulted in prompt resolution of the problem.

The health officer called on the Vermont Association of Conservation Districts (VACD) and its pioneering, 8-year-old On-Site Sewage Program (OSSP) to help towns and individual landowners prevent air and water pollution. The State appropriates funds for the program.

OSSP Specialist Jim Zabiloski immediately went to the scene, spoke to the landowner, and developed an on-the-spot, rough plan for the proper treatment of sewage generated by the landowner's family. Later in his office, Zabiloski drew detailed plans for a septic tank and sewage filter field. He also periodically inspected the work of a private contractor installing the system to make sure the materials and construction met the town's specifications for the amount of sewage expected from the homestead.

OSSP began in 1973 as a pilot project in a single district, the White River Natural Resources Conservation District (NRCD). Within 7 years, OSSP had expanded by popular demand to include five other conservation districts and more than 50 Vermont towns.

The White River NRCD and the VACD developed the model design criteria for the sewage systems cooperatively with the Soil Conservation Service, the Vermont Agency of Environmental Conservation, and the Vermont Department of Health. Criteria include detailed specifications of design, soil characteristics, minimal distances required to lot lines, water supplies, water lines, and other characteristics of the site.

Bert Senning, head of the OSSP, says requests to remedy inadequate sewage treatment or to replace old systems comprise about a third of the OSSP workload.

But the bulk of their work involves planning onsite sewage systems at new construction sites. Even with the decrease nationwide in new construction starts, Vermont's beautiful countryside draws a growing number of "flatlanders" who are building summer homes, ski chalets, motels, and retirement residences in the Green Mountain State.

Many of the sites selected for development have soils unsuitable for treating sewage. Locations se-

At left, Tim McCormick, OSSP specialist, uses a soil auger to test soil for depth, permeability, stoniness, and other characteristics that could affect sewage treatment.
At right, left to right, a landowner; Jim Cutler, OSSP specialist; and Bert Senning, OSSP head, use a soil survey to determine the best site for a septic tank and filter field.

lected for their proximity to skiing and other recreation often are steep, with shallow, stony, poorly drained soils rather than level, with permeable soils that are ideal for septic systems.

Planning onsite sewage systems always begins with an inspection to determine the kind of soil at the site. The specialist uses SCS soil survey publications to determine soil texture, depth, drainage, and the seasonal, high water table.

SCS trains sanitary specialists like Zabiloski in soil science, while VACD and other agencies provide training in sciences related to health and waste disposal.

The small, busy, seven-member OSSP staff increasingly stresses maintenance of the septic tank systems they help to install.

"A well-maintained system seems to work forever," says Senning, "but poorly maintained systems soon fail. When that happens, we are the ones who have to make them operate again."

Because of this OSSP recently began giving landowners onsite instructions on care of the systems and began distributing leaflets on maintenance. Every maintenance request that OSSP prevents frees time to plan and supervise critically needed replacements or new systems.

Zabiloski and his coworkers use county soil survey maps produced by and available from SCS to determine whether a particular site is suitable for a sewage filter field. If it is not, the specialists often are able to recommend an alternative site. Or, to accommodate the originally selected site, they are able to design such site and system modifications as surface drainage, subsurface drainage, benching, filling, and field-shape alteration. These changes help insure that water perks through the soil at the right rate; the leach field is large enough; heavy vehicles will not crush the system; soil depth is sufficient for a filter medium; or the water table does not saturate the system during the wettest seasons.

The town health officer and the town board of selectmen can deny landowner permission to build on a site if proposed modifications cannot solve the problems. The boards also can deny permission to alter septic tank systems or to increase site occupancy until system designs are adequate.

With coverage for less than a third of the State's NRCD's, the program has helped to provide a more healthful environment and safer water supplies for many towns.

When the program becomes fully operational statewide, all areas will be largely free of one cause of unsafe water; no rural sites for sewage disposal will be breeding places for harmful insects and rodents; and the pristine countryside will be free of the obnoxious odors and unsightliness of inadequately disposed sewage.

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Nadine Pitts,
writer-editor, Information and Public Affairs, SCS, Washington, D.C.

Private contractor, who built onsite sewage treatment system according to VACD specifications, uses water to insure that distribution box for the filter field is absolutely level before covering the system with soil.

Integrated Pest Management

by Donald L. Comis

Pests cause losses in agricultural production of crops, livestock, forests, and aquatic resources valued at more than $35 billion a year. Farmers and ranchers spend at least an additional $10 billion a year to control pests. "This is a burden to our society," says Dr. Waldemar Klassen, National Research Program Leader, USDA's Science and Education Administration–Agricultural Research (SEA-AR).

Integrated Pest Management (IPM) is an approach to pest control that aims to reduce that burden. With IPM, pests are managed in a rational manner considering all possible results: economic, ecological, and sociological. Two or more techniques are integrated to reduce pest populations to tolerable levels for maximum crop production. Usually pesticides are combined with other techniques such as using pest-resistant crop varieties, manipulating planting and harvest dates, and using biological controls.

To understand IPM in practical terms it might be helpful to go to John Reese's farm in Alexandria, Ohio, and see what IPM means to him. In 1973, Reese became one of the first farmers in Ohio to join an IPM program offered by USDA's SEA-Extension Service.

Seasonal workers, known as scouts, check Reese's 250 acres of corn at least once a week looking for worms, weeds, and other pests. The Extension Service trains scouts to identify pests and signs of pests—from worms to mice to plant diseases to weeds—and to keep records on standard forms. Reese said he needs the scouts to do the job because he, like most farmers, does not have either the time or the expertise.

If the scouts see 5 or more cutworms in a sampling of 200 corn plants, the county extension agent will recommend spraying a pesticide. In this case, 4 or fewer cutworms in 200 plants is the tolerable level for the cutworm population, or the economic threshold level—the level above which the predicted loss in crop yield justifies the expense of applying pesticides.

"It's strictly an economic decision," said Reese. "If I'm going to lose 2 bushels of corn an acre at $3.50 a bushel and it costs me $10 to spray an acre, I'm going to lose $3 an acre by spraying."

Reese remembers a corn borer scare in 1978 when he, like other farmers in the area, thought he might have to hire an airplane pilot to spray his 250 acres. Reese waited confidently while the scouts carefully monitored his fields. Instead of spraying 250 acres because corn borers damaged corn plants in one field, Reese sprayed only 10 acres, those fields in which the scouts recorded a high percentage of corn borer infestation.

Reese is a pioneer not only in the use of IPM but also in conservation tillage or "no-till" farming. He said

At left, hydrilla, an aquatic weed, is spreading rapidly throughout southern California and Florida waterways, threatening water flow to irrigation districts, municipalities, and drainage systems. Scientists are experimenting with chemicals and a sterile hybrid carp species to control hydrilla's spread.

that no-till increased the need for management on his farm, but that it didn't increase his pest problems. To control the weeds that result from no-till farming, Reese has weed specialists study the scouts' weed surveys of the previous year and recommend herbicide applications each year.

In addition to using scouts and no-till farming on his corn-small grain rotation, Reese plants corn that is selected for some resistance to certain insects and diseases. He uses the advice of entomologists, weed specialists, and other pest experts based on the scouts' reports to develop his IPM program, then fits IPM into his overall farm management system.

The Extension Service popularized scouting with two projects in 1971, to control insects on tobacco in North Carolina and on cotton in Arizona. North Carolina was chosen because there was a spate of accidental poisonings by parathion, and Arizona was chosen because the drift of DDT onto alfalfa when applied to adjoining cotton fields resulted in illegal residues in milk.

By 1979, the Extension Service had IPM programs in every State and two U.S. Territories, managing pests on about 45 different crops. The first projects on tobacco and cotton involved only regulating insect densities, but now many established projects manage complex communities of insects, weeds, diseases, nematodes, and other pests on specific crops.

The success of these IPM programs is reflected in the growing involvement of private businesses in IPM. There are now about 2,500 private firms that offer IPM advice as one of their services.

What's new about IPM? "Two things," said Dr. Klassen. "First, the heightened awareness of the economic, ecological, and sociological results of our actions. Second, IPM uses the systems approach in which scientists look at a farm as an ecosystem." Dr. Klassen said that IPM inspired developments in computer techniques, such as modeling, that scientists needed to analyze what happens in a farmer's field.

USDA's Science and Education Administration is currently spending more than $14 million a year on IPM Extension demonstration projects and more than $2 million a year on IPM research, including several systems research projects. Scientists in three of these systems research projects are investigating the effects of no-till farming, crop rotations, and weed control practices on the development of the most common pests. Scientists working on one of these projects hope to develop guidelines for weed control on Western United States irrigated lands.

The Soil Conservation Service is particularly interested in the projects that might contribute guidelines for IPM with weeds in no-till

SCS is particularly interested in using IPM to control weeds on rangelands. An adequate stand of desirable grasses exists on this Utah rangeland (left). Spraying controls sagebrush and improves yield of grasses. As native grasses are overgrazed on this Colorado rangeland (right), rabbitbrush moves in and competes with desirable range plants for moisture.

farming on cropland and with weeds on rangelands. USDA's Forest Service and the State Agricultural Experiment Stations are also doing extensive research on pest management. The total USDA/State budget for IPM research only is more than $10 million a year.

Before 1955, most pest control research focused on chemical controls; but in the early 1950's the dramatic eradication of the screwworm east of the Mississippi River by releasing sterile male screwworms gave a boost to research on biological controls and other nonchemical methods. By 1965, the emphasis in pest control research in the public sector reversed itself completely and most of the research focused on nonchemical controls such as resistant crop varieties and biological controls.

New developments in nonchemical control methods have given farmers many of the new tools that are now available to control insects, diseases, and weeds.

"Biological control of weeds has been practiced a number of years," Dr. Klassen said. For example, beetles are placed into farm ponds to eat alligatorweed. Scientists are also using plant pathogens to control weeds, such as a rust microorganism to control weeds in rice fields and a pathogen that controls weeds in wheatfields in the Western United States.

The main control tactics for weeds are cultivation and herbicides. Dr. Klassen said that there are many new developments in herbicides including more sophisticated methods of applying herbicides that use as little as a few grams of herbicide an acre. One particularly economical method of application is the rope wick applicator in which a rope wick is soaked in a herbicide solution and stretched between or above rows of crops to rub the herbicide onto weeds.

"Millions of acres of rangeland are in very bad shape because of a horrendous weed problem. Unless we can grow grass on these acres, we can't graze cattle on them," Dr. Klassen said. "A lot of systems research is being done for weed control."

Weeds and other pests are a major obstacle to increasing agricultural productivity. IPM is a sophisticated, scientific attempt to overcome this obstacle in a practical way. The high cost and scarcity of petroleum for pesticides, the tolerance for some or all pesticides by some pests, and the health and environmental concerns of the Nation contribute to making IPM an essential advance in the science of pest control.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

IPM Publications

The U.S. Department of Agriculture's Science and Education Administration-Extension Service and State Cooperative Extension Services have developed many educational materials for use in integrated pest management (IPM). These materials include video tapes, films, slides, and publications describing IPM with various crops.

Two of these publications, "Alfalfa: A Guide to Production and Integrated Pest Management in the Midwest" and "Corn Pest Management for the Midwest," are looseleaf manuals that can easily be revised as IPM information and techniques change.

Both manuals have general information about the specific crop and about IPM, including examples of field report forms for IPM scouts and a field identification guide to provide a fast diagnosis of crop problems. They also have keys to common insect pests, detailed information on major insect pests and beneficial insects, and information on crop diseases, nematodes, and weeds. Numerous color photographs illustrate the insects, diseases, and weeds.

The "Alfalfa" manual has a glossary and a bibliography.

A limited number of copies of "Alfalfa" (NCR Publication No. 113) and "Corn Pest Management for the Midwest" (NCR Publication No. 98) are available for $7.50 each from Publication Distribution, Iowa State University, Ames, Iowa 50011.

Another publication, "Cotton Pest Management Scouting Handbook," teaches scouts how to identify weeds, diseases, and insects and how to sample pest populations. The handbook discusses techniques for monitoring cotton plant development and has many color photographs showing the various pests and beneficial insects.

A limited number of copies of "Cotton Pest Management Scouting Handbook" are available for $2.25 from Dr. David Young, Leader, Extension Entomology, P.O. Box 5426, Mississippi State University, Miss. 39762.

These publications and other educational materials help farmers adopt IPM practices.

News Briefs

Grasses and Flowers Greet Airport Visitors

More than 100 acres of native American prairie grasses and wildflowers are on display for visitors to the Kansas City (Missouri) International Airport.

Plantings include warm-season grasses, like sideoats grama, Indiangrass, switchgrass, and big and little bluestem. Wildflowers include prairie coneflowers, dotted gayfeather, pitcher sage, and purple prairie clover. Much of the seed was supplied for evaluation purposes by the Soil Conservation Service plant materials center at Manhattan, Kans.

"The grass is cut once a year, in the spring," says David Sage, airport maintenance manager. "We've added no fertilizer to the prairie grasses since they were planted in the mid-1970's, and they are just about the only species to have survived the terrible drought last summer."

Buffalograss, which does not grow higher than 6 inches, was planted around the blue taxiway edge lights, eliminating the need for mowing to keep the lights clear of grass. Reed canarygrass was planted along the banks of holding ponds and the main reservoir.

The landscaping won the Grand Award for Professional Grounds Maintenance from *Grounds Maintenance* magazine.

Conservation Message Displayed on Iowa Billboards

"Save Our Soil for Food Tomorrow" was the simple but important billboard message read by thousands of Iowans during February, thanks to the League of Women Voters of Iowa.

The League's Citizen Information Service paid labor and paper costs to put one of the brightly colored ads in 24 Iowa communities. Two of the billboards were displayed in each of Iowa's four largest cities. Space was donated by the company owning the billboards. The conservation slogan was adapted from several provided by the Soil Conservation Service.

The outdoor ads are just one of several recent League projects in support of soil conservation, water quality, land use planning, and preservation of prime agricultural land.

Dean Miller,
public information specialist, SCS,
Des Moines, Iowa

Focus on Safety: Get the Big Picture

Have you ever been guilty of driving while drinking coffee or a soft drink, eating a sandwich, groping for something that you've dropped, reaching to get something out of the glove compartment or from the other side of the seat, trying to read a map, or gazing too long at some nice scenery?

Maybe you've done some of these things so automatically that you really didn't think of them as distractions. But they are, and they can be dangerous.

It takes only a second or two for the whole traffic picture to change, and the change could be for the worse. While behind the wheel of the vehicle, keep your eyes and your mind on your driving at all times.

James Engleka,
safety manager, SCS, Washington, D.C.

Conservation Farming Saves Fuel

Kentucky farmers saved an estimated $11.8 million worth of fuel during the last 2 years according to a special survey made public recently by the Soil Conservation Service.

"The estimated savings are based on planted acreages of 3,540,000 in 1979 and 3,750,000 in 1980 of corn, soybeans, and small grain crops," explained SCS State Conservationist Eddie L. Wood.

"Energy conscious farmers increased their planted acres in 1980 some 5.9 percent," Wood stated, "but in contrast they increased their fuel saving efforts by an impressive 18 percent over the previous year."

The special survey involved a comparison between traditional cropping patterns and conservation tillage systems. The traditional, also known as conventional tillage, consumes on the average 5.32 gallons of fuel per acre. Conservation tillage systems require only 0.88 to 2.66 gallons of fuel per acre depending on the level of management and the type of conservation practices employed according to previous SCS reports.

Wood pointed out, "The fuel saving increase emerged while comparing the differences between conventional and conservation tillage farming. Overall, 3,779,890 acres were planted using a conservation tillage system for a fuel savings of approximately 12.5 million gallons of diesel fuel in 1979 and 1980. The economic value was arrived at using a price of 95 cents per gallon of diesel fuel."

Conservation tillage encompasses a series of cultural and managerial techniques designed to conserve energy, save labor, and control erosion. There are two primary types.

One type involves such practices as crop residue management, cover crops, contour planting, grassed waterways, and reduced tillage methods that leave the crop residue on the surface. These activities, either singularly or in combination, help reduce fuel consumption on the average from 5.32 to 2.66 gallons per acre.

The other type is called no-till farming. It entails no tillage at all except that needed to place the seed into the soil—a one-time operation. Herbicides are used to kill vegetation normally controlled by tillage practices. This method uses less than one-seventh the amount of diesel fuel as conventional tillage with four cultivation trips through the field. On the average no-till decreases fuel consumption to 0.88 gallon per acre.

"The SCS survey indicated that for the first time in the State's history more acres were planted using conservation tillage systems than conventional ones," Wood pointed out. "In 1979, 49 percent of the corn, soybeans, and small grain acres were planted under conservation systems. These figures rose to 54 percent in 1980."

Jeff Butcher,
public information officer, SCS, Lexington, Ky.

Record Numbers Attend Conservation Tillage Events

A few years ago, you couldn't get many farmers to attend conservation tillage meetings, even with free dinners and door prizes. But renewed concern about soil erosion and higher growing costs has changed that. Record numbers of farmers are showing up at conservation tillage meetings in and around Iowa, as indicated by the attendance at four events held in January.

The Eastern Iowa Conservation Tillage Show in Cedar Rapids recently concluded its second year with 3,700 attending the 1½-day event. The show attracted people from about half of Iowa's counties and from several surrounding States. More than 60 exhibitors displayed their latest equipment, chemicals, and services. U.S. Senator Roger Jepsen and several no-till farmers were among the 20 speakers on the program. The show was sponsored by USDA's Soil Conservation Service, Agricultural Stabilization and Conservation Service, Science and Education Administration–Extension, and soil conservation districts in eight Iowa counties.

A 2-day tri-State conservation tillage conference held in South Sioux City, Nebr., drew 500 people, and 200 more had to be turned away because the meeting room wasn't large enough.

Two 1-day events, in Ottumwa and Atlantic, Iowa, had crowds of 700 and 300, respectively.

Though only about 1 percent of Iowa farmers are no-tillers, their number doubled last year and the majority of Iowa farmers are moving in that direction. A survey by the

Soil Conservation Service in Iowa showed that two-thirds of the State's farmers did not use a moldboard plow on some of their cropland last year.

Dean Miller,
public information specialist, SCS,
Des Moines, Iowa

After Hours Woodland Management

Applying conservation to the land is more than a full-time job for John R. Micheel. In addition to his position as a soil conservation technician with the Soil Conservation Service in Winona County, Minn., he is owner and manager of a 25-acre tree farm.

He purchased his tree farm in 1967, became a cooperator with the Winona Soil and Water Conservation District, and established himself as a member of the American Tree Farm system. In cooperation with SCS, using technical assistance from the Division of Forestry of the Minnesota Department of Natural Resources, Micheel's acreage quickly developed into a viable, timber-producing tree farm.

"The first thing I did," he recalls, "is have the timber appraised. Then I hired a logger to harvest 13 acres of red and white oak. This yielded 104,950 board feet of lumber. Fifteen percent of it was of veneer quality. The remaining 12 acres were thinned and pruned to improve future veneer quality."

After the loggers departed, the tree tops and crowns had to be removed so that new seedlings could be planted.

"I was surprised to find out how much firewood is available from tree tops and crowns," John says. "In fact, several other families and I have reduced our fuel bills substantially since we started burning firewood."

Micheel is right on schedule with his timber management plan, which includes access roads, seeding to control erosion, and fire prevention measures.

All of the access roads winding throughout the tree farm have been seeded to a mixture that benefits wildlife and helps reduce erosion. A pond has been constructed to provide wildlife habitat, protect downstream timber, prevent gully erosion, and control sediment movement.

Aside from spending time on his farm, Micheel is an active member of the local Sportsmen Club. As former president, he assisted in 12 wildlife tree plantings in Winona County. In 1976, Micheel was unanimously voted by the club as "Outdoorsman of the Year" for outstanding efforts in environmental planning and protection.

"I love my work as a soil conservation technician for SCS," he says, "but after work, there is nothing better than spending a few solitary hours up that winding road that leads to my tree farm."

Greg Hines,
district conservationist,
SCS, Worthington, Minn.

New Farm Broadcast Network on the Air

A new agriculture network began operating in Kansas in March. Known as the Kansas Agriculture Network, the service will feature reports by veteran farm broadcasters Rich Hull and Ken Root. Hull is best known in Kansas from his years as farm director of WIBW Radio and TV in Topeka. In 1978, he served as president of the National Association of Farm Broadcasters.

Reports on the Kansas Agriculture Network will focus on market quotes, State and Federal farm legislation, and other news important to Kansas farmers. Thirteen broadcasts will air daily on more than 25 affiliated radio stations. The reports will originate at the studios of the Kansas Information Network, a news network founded in 1978.

National Agricultural Law Association Formed

A new national organization for professionals working in agricultural law recently was formed. Christened the American Agricultural Law Association, the group will encourage the development and dissemination of agricultural law information.

The first president of the new association is Neil E. Harl of Iowa State University.

The group anticipates the publication of a newsletter and plans to conduct meetings and seminars on agricultural law topics.

Information about membership may be obtained by writing Professor J. W. Looney, School of Law, University of Arkansas, Fayetteville, Ark. 72701.

Saving the Soil While Pumping Oil

by Dick Bogard

The Osage County Conservation District in northern Oklahoma has started an information program to tell farmers and ranchers and oil and gas companies how conservation measures can prevent or correct land damage caused by drilling operations.

Land damage caused by bulldozers and spills of oil, chemical wastes, and saltwater used to pump oil from wells is a major soil conservation problem in Osage County, home of some of the best and most beautiful rangeland in the world. The problem also affects the rest of Oklahoma and other major oil and gas producing States such as Texas.

In Osage County, the Osage Indian Tribe owns the mineral rights to the rangelands, not the ranchers. Ranchers cannot control oil and gas drilling except to negotiate over damages to their rangelands.

Damage to the land caused by oil and gas drilling is a major conservation problem in Oklahoma and other States. SCS, conservation districts, and other agencies are working with farmers and ranchers and oil companies to develop conservation measures to prevent damage and restore rangeland.

In the past, oil and gas company representatives would offer a rancher $300 to $1,000 to cover any possible damages from drilling operations. But this small amount of money has often not been enough to restore the land after the drillers leave. Now the conservation district's information program gives the ranchers guidelines for conservation measures which the ranchers can ask oil and gas companies to follow to prevent damage and restore the rangeland.

Dick Whetsell, president and general manager of a large ranching operation in Osage County and a former SCS employee, first developed conservation guidelines to use with oil companies and encouraged the conservation district to adopt similar guidelines.

The guidelines suggest conservation measures such as building terraces to divert runoff water away from wells and installing storage pits. Dikes below the wells and slush pits could contain spills from leaking pipes or from wells and pits. Other conservation measures suggested in the guidelines include replacing any topsoil removed, planting grass when the drilling is finished, planting grass in other bare areas such as road ditches, covering roads and parking areas with gravel, and building access roads on ridgetops and across slopes to prevent erosion.

The Soil Conservation Service will advise farmers and ranchers and oil companies which conservation measures will be needed at particular sites, give an estimate on how much the measures will cost, and tell how to carry out the measures.

The Oklahoma Corporation Com-

mission, a State agency that regulates the oil and gas industries, and the Oklahoma Conservation Commission are asking several oil and gas companies to work with conservation districts on model sites that will demonstrate how landowners and oil and gas companies can cooperate and use conservation measures to protect the land.

On February 20, 1981, after planning for the model sites began, the U.S. Environmental Protection Agency awarded a $15,000 grant to the Oklahoma Conservation Commission for a 14-month project to develop a management system that will protect the soil and water resources at gas and oil drilling sites. The Oklahoma Conservation Commission may use the model sites to test ideas for a management system.

The need for such a system becomes more critical as drilling activities increase each year. In 1972, before the oil crisis caused by the oil embargo in 1973, a diverse group of large and small oil and gas companies requested 1,532 permits to search for oil and gas in Oklahoma and drilled more than 2,000 wells. In 1980, these companies requested 13,008 permits and drilled more than 9,000 wells.

The model sites proposed by the Oklahoma Corporation Commission and the Oklahoma Conservation Commission would acquaint oil and gas companies with conservation measures that will protect and restore the open tall grass prairies.

Dick Bogard,
district conservationist, SCS,
Pawhuska, Okla.

Clean Water for an Iowa Community

by Gerald Bowen

The residents of Humeston, a community of 850 people in south-central Iowa, have proof that soil conservation practices improve water quality.

Under a Resource Conservation and Development (RC&D) measure, the Humeston City Council developed a program to build tile outlet terraces on 220 acres of cropland that drains into the reservoir that supplies water for Humeston. Soil losses on sloping land averaged 13 tons an acre each year before the terraces were installed, and now average only 5 tons an acre a year.

According to Oliver Parr, Humeston water superintendent, "In 1976, our 42.8 inches of rainfall produced an average of 200 national turbidity units in raw water. In 1978, 2 years after the soil conservation work, 51.4 inches of rainfall produced an average of 14.3 national turbidity units."

Parr said he now uses only half the alum, lime, and chlorine for treatment that he had to use before the project. He also saves time and money in the backflush operations of the two settling basins at the treatment plant.

"Before the soil conservation work was done, I had to backflush one basin every month and the other every 2 months," Parr said. "Now I backflush one every 3 months and the other every 6 months."

There has been a slight increase in the use of copper sulfate. "If I put my hand into the water more than an inch deep before, I couldn't see it. That water was really muddy," Parr said. "Now, I have to use copper sulfate to remove algae. The algae couldn't grow before because sunlight couldn't penetrate the water."

"The trap efficiency of those terraces just about eliminates soil leaving the fields and getting into the water," says T. J. Thompson, chairman of the Wayne County Soil Conservation District. "We think this project clearly demonstrates that water quality can be greatly improved, simply by controlling soil erosion."

RC&D is a U.S. Department of Agriculture program to help people care for and use their natural resources to improve their community's economy, environment, and living standards. Under the program, the city of Humeston received cost-share assistance, paying only 25 percent of the project cost.

The soil conservation district and the Humeston City Council masterminded the plan to save the lake. "We didn't feel the city could finance all the work, but we did think we could take care of 25 percent of the cost," explained Councilman Wayne Street. "We felt that spending $7,500 to improve our water supply was a much better investment than having to build a new reservoir. That was really the only other alternative."

The lake's total drainage area is 626 acres. Cropland makes up 73 percent of the area, with average slopes of 5 percent.

There were four landowners involved in the 220 acres who had the most severe erosion problems. Because they couldn't invest in the terraces themselves, they agreed to allow the city to build about 3½ miles of terraces on their land.

Gerald Bowen,
former district conservationist, SCS,
Corydon, Iowa

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Meetings

June	7-11	General Federation of Women's Clubs, Cedar Rapids, Iowa
	7-12	American Water Works Association, St. Louis, Mo.
	14-18	Outdoor Writers Association of America, Louisville, Ky.
	15-24	International Grassland Congress, Lexington, Ky.
	21-24	American Society of Agricultural Engineers, Orlando, Fla.
	21-25	Forest Products Research Society, St. Paul, Minn.
	22-26	Air Pollution Control Association, Philadelphia, Pa.
	28-July 2	American Seed Trade Association, Atlanta, Ga.
	28-July 3	National Environmental Health Association, Phoenix, Ariz.
July	3-6	National Audubon Society, Estes Park, Colo.
	15-18	The Izaak Walton League of America, Inc., Syracuse, N.Y.
	18-22	American Association of Nurserymen, Inc., Cincinnati, Ohio
	26-29	American Agricultural Economics Association, Clemson, S.C.
	26-30	National Federation of Business and Professional Women's Clubs, Inc., San Francisco, Calif.
	27-30	International Symposium on Urban Hydrology, Hydraulics, and Sediment Control, Lexington, Ky.
August	2-5	Soil Conservation Society of America, Spokane, Wash.
	2-6	Conservation Education Association, Swannanoa, N.C.
	16-19	American Institute of Chemical Engineers, Detroit, Mich.
	16-19	National Farm & Power Equipment Dealers Association, Atlanta, Ga.
	16-20	National Association of County Agricultural Agents, Ithaca, N.Y.
	18-20	Association of State and Interstate Water Pollution Control Administrators, Baltimore, Md.
	26-Sept. 6	11th Congress on Irrigation and Drainage, Grenoble, France

New Publications

America's Soil and Water: Condition and Trends

by the Soil Conservation Service

This is a book about soil and water on the rural nonfederal land of the United States where crops are grown, where much of our livestock is pastured and grazed, and where our private forests are managed.

Maps, charts, and graphs augment the text in telling the story of our Nation's basic resources.

Copies are available from your local SCS office.

Soil and Water Conservation for Productivity and Environmental Protection

by Frederick R. Troeh, J. Arthur Hobbs, and Roy L. Donahue

This 718-page introductory textbook describes ways to reduce erosion around the world and conserve soil and water at the same time. The authors discuss vegetative and mechanical ways to reduce erosion. They also discuss land reclamation in surface mine areas, wetlands, arid lands, and saline soils. In a chapter on soil and water conservation agencies, the authors describe the Soil Conservation Service and conservation districts.

This book is available for $25.95 from Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

Improving Your Waterfront: A Practical Guide

by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce

This publication is a guide to successful techniques for communities and private developers to develop urban waterfronts. It includes alternative management structures, innovative districting and zoning techniques, land acquisition techniques, tax incentives to private developers, and Federal financial aid. It has case studies to illustrate these techniques and presents the information in simple language. This 110-page guide is illustrated with numerous photographs and maps and contains a bibliography.

Single copies are available from Richard Rigby, Office of Coastal Zone Management/ NOAA, Page Building 1/Room 307, 3300 Whitehaven Street, N.W., Washington, D.C. 20235.

Recent Soil Surveys Published

by the Soil Conservation Service

California: Santa Barbara County.
Colorado: Paonia Area.
Idaho: Powers County Area.
Iowa: Boone County.
Massachusetts: Essex County.
Michigan: Jackson County.
Nebraska: Gosper County and Merrick County.
Tennessee: Davidson County.
Virginia: Lunenberg County.

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